Sheet 1, 2 Sheets.

Fairbairn & Hargrave.

Combing Mach.

No. 13,870. Patented Dec. 4, 1855.

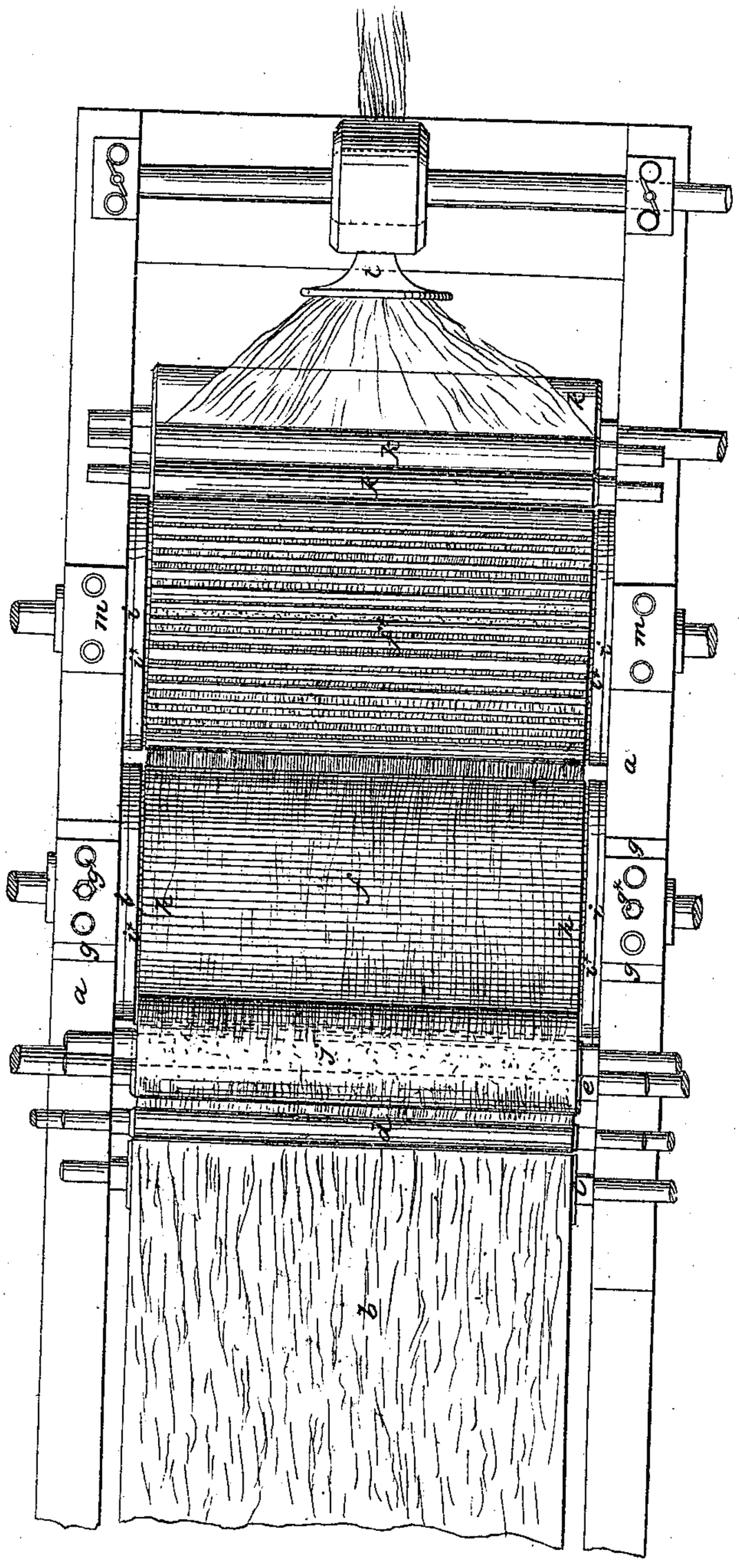

FIG. 1.

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Fig. 2.

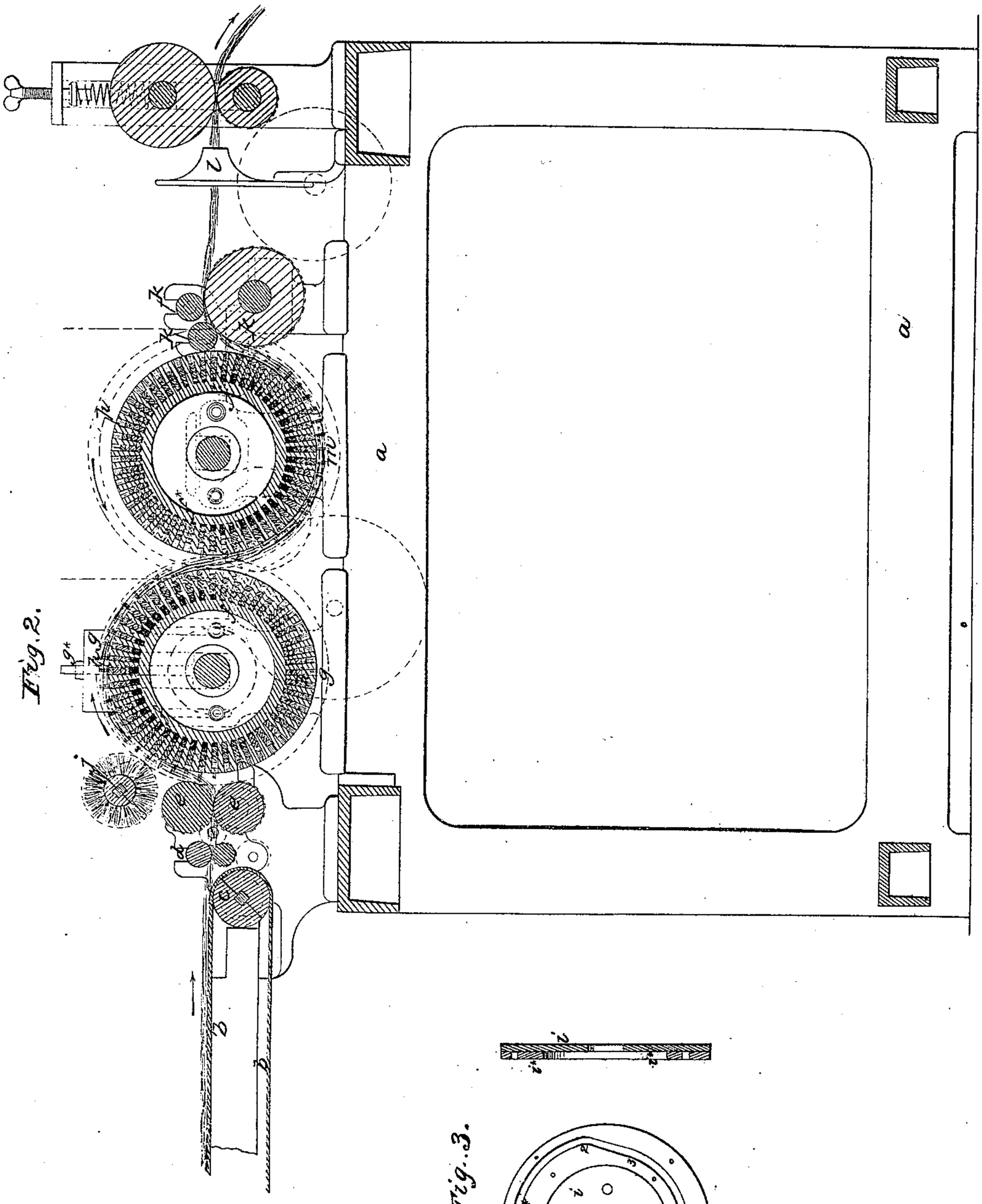

Fig. 3.

UNITED STATES PATENT OFFICE.

PETER FAIRBAIRN, OF LEEDS, AND JOHN HARGRAVE, OF KIRKSTALL, ENGLAND.

WOOL-COMBING MACHINERY.

Specification of Letters Patent No. 13,870, dated December 4, 1855.

To all whom it may concern:

Be it known that we, PETER FAIRBAIRN, of Leeds, in the county of York, machinist, and JOHN HARGRAVE, of Kirkstall, in the said county, manufacturer, subjects of the Queen of Great Britain, have invented Improvements in Machinery for Opening, Combing, and Drawing Wool Flax and other Fibrous Materials; and we do hereby declare that the following is a full and exact description of our said invention.

The object of this invention is to open out or loosen the fibers of wool and other short staple and to comb and draw it into a sheet or a sliver preparatory to its being operated upon by the drawing frame or the combing machine according to the nature of the staple under treatment. This is effected by the use of two or more rotary gill cylinders the foremost one of which will take up the staple from a pair of feed rollers and present it to a second cylinder which by rotating at an increased speed will take up the staple and will deliver it to a pair of stripping rollers from which the staple may be conducted through a trumpet mouth and delivered thence in the form of a sliver, or if thought desirable a third cylinder may be interposed between the second cylinder and the stripping rollers.

In the accompanying drawing Figure 1 shows in plan view, and Fig. 2 in longitudinal vertical section the improved machine which forms the subject of the present invention.

a, *a*, is the main framing for supporting the various parts constituting the improved machine.

b, *b*, is an endless feed apron carried by rollers *c*, *c*, and intended to supply the staple to the rotary gill cylinders. The staple as it leaves the apron is taken up by a pair of rollers *d*, *d*, and transmitted by them to a second pair of rollers *e*, *e*, whence it passes to the gill cylinder *f*, which turns in bearings in a pair of adjustable brackets *g*, *g*. This cylinder is furnished on its periphery with a series of grooves which extend from end to end thereof and form radial guides for the reception of a series of gill bars *h*, which are intended to work up and down therein. The cylinder *f*, rotates between end plates *i*, *i*, (shown detached at Fig. 3) which plates are bolted to the main framing and severally carry two flat rings *i**, *i**, forming together an eccentric groove to receive pins projecting from the ends of the gill bars *h*. These eccentric grooves as the cylinder rotates in the direction of the arrow Fig. 2 will drive out the gill bars and cause them to take up the staple from the rollers *e*, *e*. A rotating brush *j*, mounted immediately above these rollers will then press the staple down between the gill pins and by the continued rotation of the cylinder the staple will be carried around to a second gill cylinder *f** which runs at an increased speed and in an opposite direction to the cylinder *f*. This cylinder *f** is in like manner fitted with gill bars, the end pins of which work in eccentric grooves similar to that shown at Fig. 3. The staple is delivered from the cylinder *f*, to the cylinder *f** by the gills of the former cylinder being drawn within their grooves; the gills of the latter cylinder projected (at about the line of centers) beyond its periphery which movement of the gills is effected by means of the eccentric grooves formed by the rings on the fixed end plates acting upon the end pins of the gill bars. The staple is taken off the gills of the cylinder *f**, by means of stripping rollers *k*, *k*. The staple is then conducted through a trumpet mouth *l*, and so passed out of the machine, it being balled or received into cans according to the staple of which the sliver is composed. The axle of the cylinder *f* runs in boxes which slide in guides in the brackets *g*, and are capable of being adjusted vertically by means of screws *g**, and the cylinder *f**, is mounted on adjustable brackets *m* for the purpose of determining its most efficient working position as respects its degree of proximity to the cylinder *f*, and the stripping rollers *k*, *k*, respectively.

The arrangement of gearing for driving the various parts of the machine is shown by blue lines in Fig. 2.

When operating this machine say for the purpose of opening out, combing and drawing wool the staple is thrown onto the apron *b*, in the state of compact locks and by the movement of the apron in the direction of the arrow the staple is carried forward to the rollers *d*, *d*, thence to the rollers *e*, *e*, after passing between which it is taken up by the gills of the cylinder *f*, the gills for this purpose being forced forward beyond the periphery of the cylinder by reason of the groove in the plates *i*, taking an increasing diameter at a point near about on a level with the bite of the feed rollers.

When the groove has attained its greatest diameter which is reached at the point 1, it takes a circular course until it reaches the point 2, the diameter then diminishes until at the point 3, it again takes a circular course which it loses by a divergence at about the point 4, to the point 1. The gills when charged with staple carry it past the brush *j*, (which as before stated presses it down between the pins) and deliver it onto the cylinder *f**. To effect this transference of the staple the gills of the cylinder *f* should as they make their nearest approach to the circuit of the gills of the cylinder *f** recede within their grooves and the gills of the cylinder *f** should advance at an equal rate, for this purpose therefore it is important to set the eccentric grooves of the two pairs of end plates in relative positions in order to insure the proper advance and retrogression of the gills of the respective cylinders. It will be understood that as the gills retire into their grooves the staple will be pushed off the gill pins by the edges of the grooves and thus prevent waste of material or clogging of the gills with short staple or noils. The cylinder *f** by reason of its rapid rotation will draw or spread the staple as it reecives it from the cylinder *f*, and comb and partially straighten its fibers. It is then stripped off from the gills (at the opposite side of the cylinder to that at which it was taken up) by means of the rollers *k*, *k*, the gills retiring into their grooves to assist in the discharge of the staple and it may then be drawn into a sliver as shown in the drawing or wound onto a lapping roller if though desirable. From the foregoing explanation it will be understood that two three or more gill cylinders may be set in the same machine and made to take up the staple consecutively and comb and draw it into a sliver or lap.

Having now described the nature of our invention, and the manner of carrying the same into effect, we wish it to be understood that we do not confine ourselves to the precise arrangement of machinery as described with reference to the drawing, but that—

We claim as of our invention of improvements in machinery for opening, combing and drawing wool flax and other fibrous materials, combining in one and the same machine two or more rotary gill cylinders fitted with advancing and receding gills and rotating at different speeds for the purposes above set forth.

In witness whereof we the said Peter Fairbairn and John Hargrave have hereunto set our hands and seals the ninth day of December, one thousand eight hundred and fifty four.

PETER FAIRBAIRN. [L. S.]
JOHN HARGRAVE. [L. S.]

Witnesses:
JAS. WM. HAMILTON RICHARDSON,
THOS. TURNER.